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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,208	02/14/2001	David M. Filgas	GSIL 0153 PUS	2784

7590

05/08/2003

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EXAMINER

JACKSON, CORNELIUS H

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 05/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/783,208

Applicant(s)

FILGAS, DAVID M.

Examiner

Cornelius H. Jackson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.



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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pages 2-3, filed 27 January 2003, with respect to the rejection(s) of claim(s) 1, 5, 10 and 15 under 103 have been fully considered and are not persuasive.

Applicant argued the following:

a. LeGarrec is discussed and noted as offer[ing] sub-optimal operating temperatures and as such, at least one problem addressed by the present invention was disclosed therein by Applicant.

b. Applicant discloses some conventional approaches do not allow diodes to be individually tested before assembly into an array.

c. LeGarrec teaches away from each heat sink having a passage where there is fluid communication with the source of cooling fluid as claimed in Applicant's invention.

Examiner replies to Applicant's arguments are as follows:

a. LeGarrec teaches each and every element of the claimed invention, discloses a different method of using the elements. The use of air and fluids to cool a laser device is well known in the art, wherein the use of air as a coolant is less expensive, while the use of a fluid is more effective. It has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

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Also as Applicant has stated "LeGarrec is discussed and noted as offer[ing] sub-optimal operating temperatures" and Applicant's invention addresses that problem (*of being sub-optimal*). It has been held that "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

b. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., allowing diodes to be individually tested before assembly into an array) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

c. LeGarrec does not teach away from each heat sink having a passage where there is fluid communication with the source of cooling fluid as claimed in Applicant's invention. LeGarrec merely states what is used in commercial laser diodes.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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3. Claims 1-18, 20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Ullman et al. (5903583). Ullman et al. disclose a method for cooling at least one laser diode **1e** with a cooling fluid which does not come into direct contact with the at least one laser diode, the method comprising: providing a source of cooling fluid; positioning heat sinks **36** on opposing sides of the at least one laser diode wherein each of the two heat sinks has a passage **38, 39, 40** formed therein and therein the passages are in fluid communication with the source of the cooling fluid but not with the at least one laser diode; and circulating the cooling fluid through the passages wherein heat is removed from the sides of the least one laser diode by conduction into the heat sinks and wherein heat is removed from the heat sinks by the cooling fluid via forced convection, **see col. 9, lines 38-60**.

Regarding claim 5, Ullman et al. teach positioning heat sinks on opposing sides of each of the laser diodes **1e** such that each heat sink **36** is in contact with a single laser diode **1e**, **see Fig. 8 and col. 9, lines 38-60**.

Regarding claims 2 and 6, Ullman et al. teach electrically and thermally bonding the heat sinks to the at least one laser diode, **see col. 9, line 38-col. 10, line 43**.

Regarding claims 3, 7 and 8, Ullman et al. teach the heat sinks serve as electrical connections to and from the at least one laser diode and all the other stated limitations, **see col. 10, lines 13-67**.

Regarding claim 4 and 9, Ullman et al. teach a heat spreader **41** made of a material different than the material of the heat sink **36** to which the heat spreader **41** is attached and all the other stated limitations, **see col. 10, lines 56-67**.

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Regarding claim 10, Ullman et al. teach a system **Fig. 8** for cooling at least one laser diode **4** with a cooling fluid which does not come into direct contact with the at least one laser diode, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see col. 9, lines 38-60**.

Regarding claim 15, Ullman et al. teach a system **Fig. 8** for cooling an array of laser diodes with a cooling fluid which does not come into direct contact with the array laser diodes, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see col. 9, lines 38-60**.

Regarding claims 11 and 16, Ullman et al. teach a flow inlet and a low outlet, **see col. 9, lines 38-60**.

Regarding claims 12, 13, 17 and 18, Ullman et al. teach a support structure, **49**.

Regarding claims 14 and 20, Ullman et al. teach all the stated limitations, **see col. 8, line 21-col. 9, line 3**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Le Garrec et al. (6091746). Le Garrec et al. teach a method for cooling at least one laser diode with a cooling fluid which does not come into direct contact with the at least one

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laser diode, the method comprising: providing a source of cooling fluid; positioning heat sinks on opposing sides of the at least one laser diode wherein one of the two heat sinks has a passage formed therein and therein the passages are in fluid communication with the source of the cooling fluid but not with the at least one laser diode; and circulating the cooling fluid through the passages wherein heat is removed from the sides of the least one laser diode by conduction into the heat sinks and wherein heat is removed from the heat sinks by the cooling fluid via forced convection, **see col. 3, line 54-col. 4, line 56**. Le Garrec et al. fails to teach each heat sink having a passage where there is fluid communication with the source of the cooling fluid but not with the at least one laser diode and circulating the cooling fluid through the passages wherein heat is removed formed in each heat sink, instead Le Garrec et al. teach for every pair of heat sinks, one heat exchange takes place by natural convection of the ambient air and other by circulating the cooling fluid through the passages, **see col. 1, lines 39-46**. It would have been an obvious matter of design choice to place a passage in the each of the heat sinks for heat exchange by convection of a cooling fluid, since applicant has not disclosed that by having fluid cooling on two opposing sides of the laser solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with heat exchange taking place by natural convection of the ambient air.

Regarding claim 5, Le Garrec et al. teach positioning heat sinks on opposing sides of each of the laser diodes **4** such that each heat sink **6 and 14** is in contact with a single laser diode **4**, **see col. 4, lines 16-24**.

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Regarding claims 2 and 6, Le Garrec et al. teach electrically and thermally bonding the heat sinks to the at least one laser diode, **see col. 3, line 54-col. 4, line 9.**

Regarding claims 3 and 7, Le Garrec et al. teach the heat sinks serve as electrical connections to and from the at least one laser diode, **see col. 4, lines 13-14.**

Regarding claim 4, Le Garrec et al. teach a heat spreader made of a material different than the material of the heat sink to which the heat spreader is attached, **see col. 3, lines 54-63.**

Regarding claim 8, Le Garrec et al. teach all the stated limitations, **see col. 4, lines 41-56.** Also, it has been held to be within the general skill of a worker in the art to select a known material/arrangement on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 10, Le Garrec et al. teach a system **Fig. 1** for cooling at least one laser diode **4** with a cooling fluid which does not come into direct contact with the at least one laser diode, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see claim 1 above.**

Regarding claim 15, Le Garrec et al. teach a system **Fig. 1** for cooling an array of laser diodes with a cooling fluid which does not come into direct contact with the array laser diodes, the system comprising: a source of cooling fluid; a plurality of heat sinks and a mechanism for circulating the cooling fluid, **see claim 5 above.**

Regarding claims 11 and 16, Le Garrec et al. teach a flow inlet and a low outlet.

Regarding claims 12, 13, 17 and 18, Le Garrec et al. teach a support structure.

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Regarding claims 14 and 20, Le Garrec et al. teach all the stated limitations, **see col. 3, line 54-col. 4, line 9.**

Regarding claim 19, Le Garrec et al. teach all the stated limitations, **see Fig. 1, reference number 52.**

Regarding claims 21-23, Le Garrec et al. teach all the stated limitations, **see 8 above.**

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cornelius H. Jackson whose telephone number is (703) 306-5981. The examiner can normally be reached on 8:00 - 5:00, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7721 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

CHJ

chj
April 30, 2003

Paul Ip

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